

1.42
508 In

Southern Division

JUL 12 1945

INSTRUCTIONS FOR INSPECTING A STOCK POND, DAM, OR RESERVOIR

A. General.

These instructions are for use by persons who know the proper use of a farm level and rod and how to measure horizontal distances. Such person must also understand the AAA specifications for earthen dams and reservoirs and the construction methods for the practice.

B. Execution of SRS-51.1. Heading.

Enter in the spaces provided the State and county, program year, farm serial number, name of the farm or ranch, date construction work was completed, if final inspection is being made, and a notation to show whether the survey is preliminary or final. The number of the dam or a short description of the location should be entered in the heading where there is more than one dam on the farm or ranch.

2. Preliminary Survey.

- a. Section 1. Select the site for the structure and the location for the floor of the spillway. The spillway should be located on undisturbed sod, if possible.

Set stakes along the center line of the base of the dam at intervals (not more than 50 feet apart) where there is a break in the slope. Measure the horizontal distance between the stakes, moving the stakes, if necessary, to place them at even foot-intervals.

Record the distance in column A (the distance from the end of the dam) and mark the stakes accordingly.

Set up the farm level so that the rod reading taken on the floor of the spillway will be equal to the required freeboard, considered as the height of the settled dam above the floor of the spillway. The instrument will then be level with the top of the proposed dam.

Establish a bench mark, preferably on the center line of the dam, far enough away so that it will not be disturbed during construction, and record the rod reading taken on the bench mark in the space provided in the heading of column B.

Take a rod reading beside each stake along the center line of the dam, and record the rod readings in column C opposite the corresponding station.

From the rod reading recorded in Column C, which will also be the height of the dam at each station, calculate the distance from the center to the inside and outside toe of the dam at each station, considering the top width and the required slope of the face of the dam (one half top width plus height times slope).

Check the theoretical location for the toe stakes by taking a rod reading at each calculated toe point and revise the distance from the center, if necessary, in order to maintain the necessary slopes.

Set the toe stakes to mark the outline of the base of the dam.

Record, in the applicable column B "inside" and D "outside," the rod readings and the distance out from

(6'-4")
the center, in the form of a fraction, ($\frac{14}{1}$). If the slope of the ground across any section is not a uniform line, take additional rod readings at the break in the slope across the base of the dam, within the base, and also record these data with the corresponding distances, in the form of a fraction, in the applicable column B or D. Where the ground is not level, take additional rod readings and measure the distance to points (approximately ten to twenty feet) outside the toe stakes at each station so that in cases where the dam is later shifted a few feet from the original location, the elevations at the base will be available for extending the plot for each section. Circle the notes for the toe stakes in columns B and D.

Mark on each outside toe stake the height of the fill above that stake, increased by the proper percentage to allow for shrinkage.

In cases where it is necessary to move the level after part of the cross-sections (the upper stations at each end of the dam) have been taken, move the level taking a turn on the rod at one of the center line stakes. Record both the foresite (-) and the backside(+) on the turning point in the spaces provided in Section 2. Enter the height of instrument (H.I.) in column A, Section 1, and also in column C, Section 2. In such cases, take into account the difference in the height of the level in calculating heights and in plotting cross-sections. (Record also in Section 2 other conventional level notes where the instrument is moved in taking the cross-sections.)

Enter the freeboard in the space provided in column D. In one of the unused lines in column B enter the notation "Spillway" and enter the rod reading on the spillway in column C.

Stake out the spillway, if there is to a cut spillway. Enter the width of the spillway in the space provided. Enter the slopes (example 2:1) in the space to the right of the space provided for width of spillway.

- b. Calculations. To calculate the preliminary yardage, enter the height of the dam at each station in column E.

Enter the top width in column F.

From the notes in columns B and D, enter the base width in column G. (The notes for the toe stakes are encircled)

Enter the average of the top and bottom widths in column H.

Multiply the height at center by the average width and enter the area in column I.

Average the end areas of adjacent sections and enter the result in column J.

From the record of length in column A, enter the length of each segment in column K.

Multiply the length of each segment by the average end area and enter the volume for each segment in column L.

Add the entries in column L to obtain the total cubic feet and enter the result in the space provided.

Divide the entry for cubic feet by 27 to obtain the total cubic yards, and enter the result in the space provided in column L.

Since the heights shown on the preliminary survey notes are net heights, it is not necessary to subtract the shrinkage to obtain net yardage.

Check the calculations and enter the yardage in column L opposite "Net Yardage."

Where the base is irregular and it is necessary to plot the cross-sections to scale, determine the area of each plotted cross-section and enter the results in column I, in which case it is not necessary to make entries in columns G or H. However, the entries for columns J, K, and L are to be made as described above.

The person making the preliminary survey shall sign the report and enter the date in the spaces provided. The person checking the computations shall enter the date and initial, or sign the report in the space provided.

- c. Section 2. Level Notes. Where it is necessary to move the level in making the preliminary survey, record the necessary level notes in the spaces provided in Section 2, describe the location of the bench mark in the space provided in column F. Enter the rod reading (F.S.) on the spillway floor in the space provided.
- d. Section 3. Draw a sketch of the site showing the location of the pond with reference to identifying land marks where necessary for proper identification.

3. Final Survey.

- a. Section 1. If the survey is final, set temporary stakes along the top of the dam over the original stations, at the breaks in the slope.

Measure the distances between stations and enter the station numbers in column A.

Set up the farm level slightly above the top of the dam.

Take a rod reading on the bench mark and on the floor of the spillway. Enter the readings in the spaces provided.

Take a rod reading at each station on the center line, at each shoulder, and at the toe of each slope (inside and outside).

Measure the horizontal distance at each station from the center to each shoulder and each toe of slope.

Enter the rod readings and distances in fraction form in columns B, "inside," and D "outside,"

Enter the rod reading at the center (each station) in column C.

In cases where the slope of the fill is not uniform between the shoulder and the toe of the slope (or in cases where the pond is partly filled with water at the time the final survey is made) take a rod reading part way down the slope, where necessary, and measure the corresponding distance out. Enter the data in the form of a fraction in columns B and D.

Enter the data for freeboard, width of spillway, and slopes as for the preliminary survey described in Paragraph B, 2, a.

- b. Calculations. If the base of the dam is approximately a straight line, the end area of each section may be computed by multiplying the average width by the height at the center.

Enter the height at the center in column E.

Enter the top width in column F.

Enter the base width in column G.

Enter the average width in column H.

Enter the computed end areas in column I.

Average the end area of adjacent sections and enter the result in column J.

From record of length in column A enter the length of each segment in column K.

Multiply the average end area by the length of the segment and enter the volume in column L.

Add the entries in column L, and enter the total cubic feet in the space provided.

To obtain the result in cubic yards, divide by 27 and enter the cubic yards in the space provided in column L.

Enter the computed shrinkage in the space provided.

Subtract the shrinkage from the total cubic yards and enter the result in the space provided in column L opposite "Net Yardage."

Check computations.

The end area, column I, for each section should be obtained by plotting the cross-section to scale where the base is not approximately a straight line as shown by the preliminary survey. Attach the plot of the cross-section to the report.

Measure the width of spillway and enter the width in the space provided.

The persons who inspected the dam shall sign the report and enter the date in the spaces provided. The persons who checked the calculations shall initial or sign the report and enter the date in the space provided.

In cases where the cross-section notes are recorded in a field notebook, the entries in columns B, C, and D, section 1, and the entries in Section 2 may be omitted, provided the pages on which the notes are recorded are attached to SRS-51. In all cases, however, it is necessary to make the entries in columns A and I through L to compute the volume.

- c. Section 2. Level Notes. Where it is necessary to move the level in making the final survey, enter the level

notes in the spaces provided in Section 2. Enter the rod reading on the floor of the spillway in the space provided.

- d. Section 3. Where necessary for proper identification draw a sketch of the site showing the location of the pond unless the sketch is shown on SRS-51 for the preliminary survey.

4. Final Survey where the Preliminary Survey Notes on SRS-51 are available. Where it is evident that the dam has been located and constructed as planned and the outside toe stakes are visible at the bottom of the outside slope, the final survey may be made by setting up the farm level at the original height of the instrument or at an even number of feet above that height.

- a. Section 1. Take check rod readings at each station along the center of the top of the dam, at the shoulders, and at the toe of the slopes.

Enter the check rod readings (preferably with colored pencil) in column C and beside or above the original entries for the preliminary survey notes in columns B and D. Check the inside slope in several places by taking two rod readings at a convenient interval down the slope.

Measure the top width of the dam in several places.
Measure the width of spillway.

If the check rod readings vary only two or three inches (or tenth of feet) from the calculated rod readings for the center line and shoulders (including the added height to provide for shrinkage), and if the slopes check with the notes for the preliminary survey, it is not necessary to recalculate the yardage.

The person making the final survey shall enter the top width and the slope in an unused space in Section 1. He shall sign the report and enter the date in the space immediately below the space provided for date.

If the rod readings do not check with the plan for the dam, as shown by the preliminary survey, make the final survey and record the notes on another SRS-51 in accordance with instructions in Paragraph B, 3, a, and calculate the yardage in accordance with the instructions in Paragraph B, 3, b.

5. Wing Walls (an earthen wall built at right angles to dam on downstream side at spillway to prevent water from spillway washing out the fill at the toe of dam).

The final survey and yardage calculations for a wing wall should be made as for a dam. Where the wing wall is only 20 or 30 feet long, the average cross-section area (column H) may be obtained by taking measurements for cross-section near

the middle, or by taking measurements at each end and averaging the end areas.

The notes are to be kept separate from the notes for the dam. If there is not enough space on SRS-51 to record the notes separately, a Form SRS-51, properly identified, should be used to record the survey notes and for making the necessary calculations for yardage.

6. Reservoirs or "Dug-out" Ponds.

Where the pond is a "dug-out" basin or reservoir with storage below ground level and the dam is only a spoil bank not built to hold water, the final survey should be made as described below.

Enter the necessary data in the heading of SRS-51.

Set stakes along the longer axis of the reservoir at intervals selected to divide the length into sections corresponding to the changes in the outline or slope of the sides.

- a. Section 1. Measure the distance between the stakes and enter the distance in column A.

Set up the farm level and take rod readings at each station and at intervals of 15 or 20 feet across the section, including a rod reading on normal ground level at each side of the pond. Enter the rod readings and distance from the center in columns B, C, and D.

Plot each cross-section and obtain the cross-section area. Enter in column I the end area for each station.

Average the adjacent end areas and enter the average area in column J.

Enter the distance between stations in column K.

Multiply the average end area by the corresponding length of the segment (distance between stations) and enter the result in column L.

Add the entries in column L and enter the total cubic feet in the space provided.

Divide the total cubic feet by 27 and enter the yardage excavated in the space provided in column L.

Enter the net cubic yards in the space provided. Since there is no shrinkage to be provided for, the net yardage will be the same yardage as shown by the entry, above for "cubic yards."

Check the computations.

Enter the date and sign the report in the spaces provided.

- b. Other Entries. Make the entries in Sections 2 and 3 in accordance with instructions in Paragraph B, 2, a; B, 2, c; and B, 2, d.

7. Enlarging Existing Dams.

- a. Preliminary Survey. Before the construction work is begun, it is necessary to take cross-section notes for the existing dam in accordance with the instructions in Paragraph B, 3, a, so that each section may be plotted to scale.

It is also necessary to take trial rod readings and measure the horizontal distances outside the base of the existing dam and to set the toe stakes for the new construction. The rod readings and measurements should be taken and entered on SRS-51 in accordance with instructions in Paragraph B, 2, a.

- b. Calculations. Calculate the preliminary yardage by obtaining the cross-section area between the outline of the existing dam and the outline of the proposed dam. This may be done by plotting each section to scale and using a planimeter to obtain the area.

After the cross-section areas have been obtained compute the preliminary yardage in accordance with the instructions in Paragraph B, 2, b.

- c. Final Survey. Take notes for the final survey in accordance with instructions in Paragraph B, 3, a.

Plot the final cross-section over the plotted sections for the preliminary survey. Redetermine the cross-section areas.

Compute the final yardage. (See B, 3, b). Subtract the shrinkage and enter the net yardage in the space provided in column L.

Issued June 19, 1945 with the approval
of the Chief.

C. D. Walker

C. D. Walker
Director, Southern Division